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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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EXAMINER	
NGUYEN, H	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/712,190	KIM, WOONG-KWON	
	Examiner	Art Unit	
	HOAN C. NGUYEN	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

1. Claims 1-3, 6-8, 11, 12, 13, 14, 15, 16, 21, 22, 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Zhong et al. (US5994721).

Zhong discloses in Fig. 4 that a liquid crystal display (LCD) device comprises (a) a substrate 19; (b) a gate electrode 17 over the substrate; (c) an active layer made of semiconductor layer 23 that is particularly made of intrinsic amorphous silicon (column 7, lines 43-44) and aligned with the gate electrode; (d) an insulation layer between the gate electrode and semiconductor layer; (e) a source electrode 29 and a drain electrode 31 electrically connected with semiconductor layer through Ohmic contact layer with doped semiconductor layer 25 (column 8, lines 10-14); (f) a color filter layer, also insulating planarization layer 101, (column 7, lines 45-46) on and in direct contact with the source and the drain electrodes; (g) a pixel electrode 3 on the planarization layer and electrically connected with drain electrode via the opening 35 in the planarization layer. Color filter layer overlaps the source and drain electrodes enough to prevent light leakage. A portion of the etching doped semiconductor between the source and drain electrodes forms a channel 27 of a resulting intermediate structure.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 4, 5, 9, 10, 17, 23, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhong et al. (US5994721) in view of Kashiwazaki et al. (US6162510).

Zhong discloses in Fig. 4 that a liquid crystal display (LCD) device comprises (a) a substrate 19; (b) a gate electrode 17 over the substrate; (c) an active layer made of semiconductor layer 23 that is particularly made of intrinsic amorphous silicon (column 7, lines 43-44) and aligned with the gate electrode; (d) an insulation layer between the gate electrode and semiconductor layer; (e) a source electrode 29 and a drain electrode 31 electrically connected with semiconductor layer through Ohmic contact layer with doped semiconductor layer 25 (column 8, lines 10-14); (f) a color filter layer, also insulating planarization layer 101, (column 7, lines 45-46) on and in direct contact with the source and the drain electrodes; (g) a pixel electrode 3 on the planarization layer and electrically connected with drain electrode via the opening 35 in the planarization layer. Color filter layer overlaps the source and drain electrodes enough to prevent light leakage. A portion of the etching doped semiconductor between the source and drain electrodes forms a channel 27 of a resulting intermediate structure. However, Zhong does not disclose expressly that semiconductor layer comprising a first layer on the

insulation layer, an etch stop on the first layer, and a second layer over the first layer and the etch stop layer.

Kashiwazaki discloses in Figs. 6C-F that that semiconductor layer comprising a first layer104 on the insulation layer 103 over gate electrode 102, an etch stop layer 105 on the first layer, and a second layer 106 over the first layer and the etch stop layer. In Fig. 2, Kashiwazaki discloses the light shield 11 below gate electrode for protecting TFT.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a LCD device as Zhong disclosed. The semiconductor layer of a modified LCD device comprises a first layer on the insulation layer over gate electrode, an etch stop layer on the first layer, and a second layer over the first layer and the etch stop layer for preventing first layer made of semiconductor from being etched. The light shield below gate electrode for protecting TFT.

3. Claims 19, 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhong et al. (US5994721) in view of Oike (US6104459A).

Zhong discloses in Fig. 4 that a liquid crystal display (LCD) device comprises (a) a substrate 19; (b) a gate electrode 17 over the substrate; (c) an active layer made of semiconductor layer 23 that is particularly made of intrinsic amorphous silicon (column 7, lines 43-44) and aligned with the gate electrode; (d) an insulation layer between the gate electrode and semiconductor layer; (e) a source electrode 29 and a drain electrode 31 electrically connected with semiconductor layer through Ohmic contact layer with doped semiconductor layer 25 (column 8, lines 10-14); (f) a color filter layer, also insulating planarization layer 101, (column 7,

lines 45-46) on and in direct contact with the source and the drain electrodes; (g) a pixel electrode 3 on the planarization layer and electrically connected with drain electrode via the opening 35 in the planarization layer. Color filter layer overlaps the source and drain electrodes enough to prevent light leakage. A portion of the etching doped semiconductor between the source and drain electrodes forms a channel 27 of a resulting intermediate structure. However, Zhong does not disclose expressly that (a) an interlayer insulator formed entirely over the substrate having first and second contact holes, which respectively expose a portion of the source and drain regions therebelow; (b) the active layer is made of poly-silicon.

Oike discloses In Fig. 7 that (a) the active layer 51a is made of poly-silicon (column 7, lines 66-67); (b) an interlayer insulator 63 and 65 formed entirely over the substrate having first and second contact holes 53a and 54 which respectively expose a portion of the source and drain regions therebelow.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a LCD device as Zhong disclosed. The modified LCD device further comprises (a) an interlayer insulator formed entirely over the substrate having first and second contact holes, which respectively expose a portion of the source region for connecting to the data line and drain region for connecting to pixel electrode; (b) the active layer is made of poly-silicon for forming another type TFT of solid-phase-crystallized silicon TFT that can be manufactured at low temperature, and operates with low threshold voltage and leakage current.

4. Claims 18 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhong et al. (US5994721) in view of Nishikawa et al. (US5724107).

Zhong discloses in Fig. 4 that a liquid crystal display (LCD) device comprises (a) a substrate 19; (b) a gate electrode 17 over the substrate; (c) an active layer made of semiconductor layer 23 that is particularly made of intrinsic amorphous silicon (column 7, lines 43-44) and aligned with the gate electrode; (d) an insulation layer between the gate electrode and semiconductor layer; (e) a source electrode 29 and a drain electrode 31 electrically connected with semiconductor layer through Ohmic contact layer with doped semiconductor layer 25 (column 8, lines 10-14); (f) a color filter layer, also insulating planarization layer 101, (column 7, lines 45-46) on and in direct contact with the source and the drain electrodes; (g) a pixel electrode 3 on the planarization layer and electrically connected with drain electrode via the opening 35 in the planarization layer. Color filter layer overlaps the source and drain electrodes enough to prevent light leakage. A portion of the etching doped semiconductor between the source and drain electrodes forms a channel 27 of a resulting intermediate structure. However, Zhong does not disclose expressly that a LCD device further comprises a light shield layer below the gate electrode or TFT.

Nishikawa discloses in Fig 2 that a LCD device comprises that a light shield layer 11 below the gate electrode 17G; thus a light shield layer formed between the substrate and the TFT and an insulating layer covering the light shielding layer.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a LCD device as Zhong disclosed. The modified LCD device further comprises a light shield layer below the gate electrode 17G; thus a light shield layer formed between the substrate and the TFT and an insulating layer covering light shielding layer for shielding light from TFT and improving the aperture ratio.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAN C. NGUYEN whose telephone number is (703)306-0472. The examiner can normally be reached on MONDAY-THURSDAY:8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, SIKES L WILLIAM can be reached on (703)308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-5841 for regular communications and (703)308-5841 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0530.

HOAN C. NGUYEN
Examiner
Art Unit 2871

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August 13, 2001

William L. Sikes
Supervisory Patent Examiner
Technology Center 2800